ESA-138 Final Public Report

Introduction:

GM's Pontiac MFD site generates steam to meet its space heating needs in the winter and to run its Absorption Chillers in the summer. The steam load remains around 190,000 lbs/hr in the winter and 35,000 lbs/hr in the summer. The Condensate return is around 70%, and in the past, it has reached levels above 80%. During the year 2005, this site spent close to $12 million for purchased natural gas. The major share of natural gas use is for steam generation, and a smaller share is for heating the Air Handling Units.

Objective of ESA: To provide U.S. industries technical assistance targeted to reduce fuel expenditure.

Focus of Assessment:

The focus of Energy (Steam) System Assessment (ESA) is as follows: (1) to identify energy cost reduction opportunities and (2) to train in-plant personnel to continue and sustain the improvements. This plant consumed over $12 million worth of natural gas in 2005 to meet its steam & HVAC needs. Hence, this ESA is focused on the steam distribution, the steam users, and the condensate recovery & return at the site.

Approach for ESA:

Learn about the site from the plant contact person(s). With their assistance, collect the relevant energy data, brief them on DoE Steam Tools & help them enter data, identify opportunities for Improvement & evaluate improvement projects with DoE Tools.

General Observations of Potential Opportunities:

During 2005, this plant consumed 1,028,450 MCF of natural gas for a total cost of $9,340,372 in its boilers. The natural gas usage at HVAC units is expected to be approximately an additional $3 million.

The savings opportunities are classified as Near, Medium & Long Term opportunities as defined below:

- Near term opportunities include actions that could be taken as improvements in operating practices, maintenance of equipment, or relatively low cost actions or equipment purchases.
- Medium term opportunities would require purchase of additional equipment and/or changes in the system, such as the addition of recuperative air preheaters, and the use of energy to substitute current practices of steam usage, etc. It would be necessary to carryout further engineering and return on investment analysis.
- Long term opportunities would require testing of new technology and confirmation of performance of these technologies under the plant operating conditions, with economic justification to meet the corporate investment criteria.

During this ESA, nine energy cost savings opportunities were identified and six of them were assessed using the SSAT model. The total estimated annual savings evaluated by SSAT model is $1.9 million. This could bring down the annual utility cost by 8.6%.

The energy cost savings opportunities evaluated through SSAT model are listed below;

1. Reduce HP steam demand: *(Near Term)*
   Some of the former production lines have been either rearranged or relocated to other facilities. Lighting at most of the idle building areas, where no activity occurs, is already shut-off.. Similarly, the heating circuits in such idle / no activity areas also could be shut-off. To isolate and shut-off the idle area steam lines, piping modifications may be required.
   By isolating the redundant distribution pipe lines GM / MFD Pontiac would save $378,000/yr.

2. Reduce LP steam demand: *(Near Term)*
   Some of the former production lines have been either rearranged or relocated to other facilities. Lighting at most of the idle building areas, where no activity occurs, is already shut-off. Similarly, the heating circuits in such idle / no activity areas also could be shut-off. To isolate and shut-off the idle area steam lines, piping modifications may be required.
   By isolating the redundant distribution pipe lines GM / MFD Pontiac would save $367,000/yr

3. Modify the Feed water Heat Recovery Exchanger using Boiler Blowdown *(Medium Term)*
   At present, only flash steam from the blowdown water is recovered at the Deaerator. The sensible heat from blowdown water may also be recovered by installing a heat exchanger, using the make-up water as the heat sink.
   By recovering the sensible heat from blowdown water, GM / MFD Pontiac would save $49,000/yr.

4. Change Condensate Recovery Rates *(Near Term)*
   All of the 4 buildings (Bldgs. #14, #15, #17 & #25) have provisions to return the condensate back to the Boiler house. However at few places, the condensate pumps are either not working properly or have seal leaks, resulting in slow draining of the condensate.
   By fixing the problems in the defective condensate pumps, GM/MFD Pontiac would save $203,000/yr.

5. Modify the Medium (High) Pressure Condensate Flash System *(Medium Term)*
   Parts of the heating system at buildings #14, #15 & #25 use high pressure steam, while the remaining parts are heated with low pressure steam. Separate condensate collection lines and condensate receivers are available at each building. However, the flash steam from both the high pressure condensate, as well as the low pressure condensate, is vented into the atmosphere. The flash steam from the high pressure condensate can be utilized in the nearest unit heaters that use low pressure steam.
   By using the flash steam from high pressure condensate, GM/ MFD Pontiac could save $606,000/yr.

5. Improve Insulation *(Near Term)*
   Some of the condensate pipe line sections are not insulated. At few locations, the removed insulation from the steam lines have not been replaced. By repairing the removed insulation or adding new insulation on to the bare hot surfaces, GM/MFD could save $298,000/yr.

Three additional energy cost savings opportunities, not evaluated by SSAT are also listed below;

7. Eliminate the unnecessary second pumping in condensate transportation.
   In Building #12 & Building #14, condensate is pumped twice. By modifying the piping, this double pumping can be eliminated.

8. Recover heat from Compressed Air Cooling at Power House.
   Heat could be recovered from the cooling of at least one of the two air compressors that are in service at any time. The existing heat exchangers (that are put in service only when the Cogen plant is in service) may be utilized for this by rearranging the piping.

9. Consider installing a Heat pipe at the Instrument Air Dryer
   The instrument air dryer at the Boiler house is a refrigerated dryer. Since this refrigerated air dryer first dehumidifies the air and then reheats it, it is a good candidate for application of the Heat Pipe technique to save energy. This opportunity should be explored.

Estimated % of plant's natural gas savings;

a) From Near Term opportunities: 11.8%
b) From Medium Term opportunities: 4.4%

Management and UAW Support and Comments:

A corporate level management team and the UAW/WFG Joint Task Team encourage any effort that reduces the natural gas usage at all of its plants located around the country. The Pontiac, MI site team has shown great enthusiasm towards reducing the natural gas cost of their plant. They have already brought down natural gas usage by 6.9% during 2005 compared to the previous year 2004.

DOE Contact at Plant/Company: (whom DOE would contact for follow-up regarding progress in implementing ESA results.)

Contact for the GM/MFD Plant:

Mr. Michael Newton, Phone: 248 857 2680, email: mike.Newton@gm.com
Site Utility Manager,
Worldwide Facilities Group, Pontiac North site.
Plant 17, Power House, 900, Baldwin.
Pontiac, MI – 48340-2952

Contact for GM UAW / WFG Joint Task Team:

Mr. Robert H. Varcoe, Phone: 248 753 4137, email: robert.varcoe@gm.com
Construction & Building Maintenance,
PCC-Central, 2000, Centerpoint Parkway,
Pontiac, MI - 48341-3147